

## Choosing Classes

### Purpose:

The purpose of this activity is to engage students in working with common fractions, decimals and percentages interchangeably, to solve a problem.

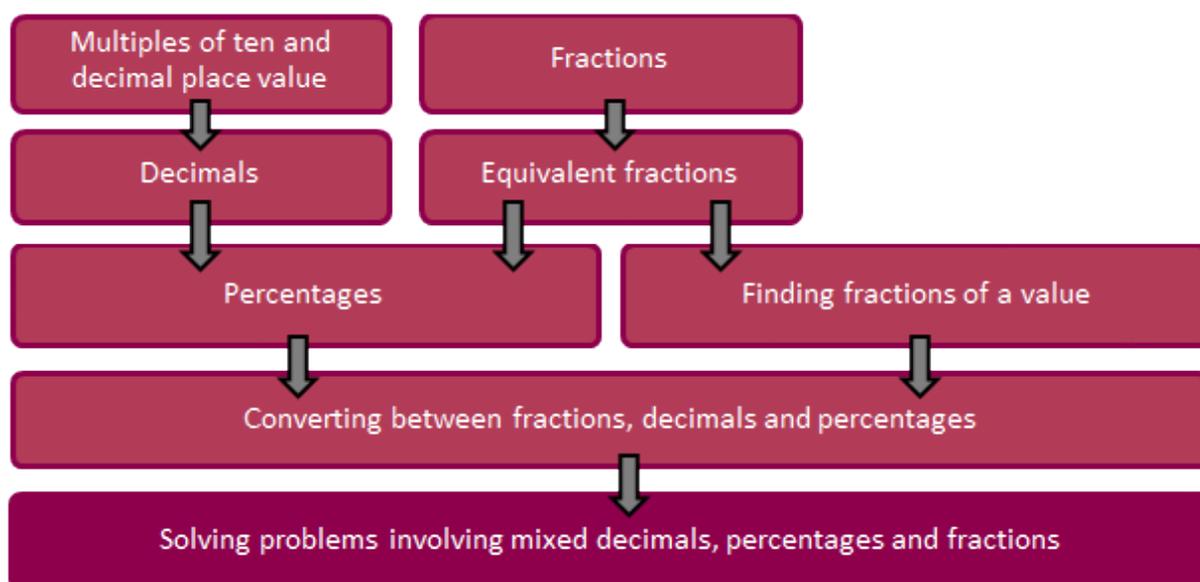
### Achievement Objectives:

NA4-5: Know the equivalent decimal and percentage forms for everyday fractions.

NA4-3: Find fractions, decimals, and percentages of amounts expressed as whole numbers, simple fractions, and decimals.

### Description of mathematics:

The background knowledge and skills that need to be established before and/or during this activity are outlined in the diagram below:



#### Multiples of ten and decimal place value

Write as a decimal, 45 thousand and 33 hundredths.

#### Decimals

Find the sum of 2.067, 0.445 and 12.05.

#### Fractions

If six pizzas are shared equally between ten people, what fraction of a pizza does each person get?

#### Equivalent fractions

Simplify  $\frac{12}{246}$ .

#### Percentages

360 people out of 2000 voted for a candidate. What percentage of votes did that candidate receive?

#### Finding fractions of a value

Find  $\frac{4}{5}$  of 85

### Converting between fractions, decimals and percentages

Express  $\frac{4}{5}$  as a decimal and as a percentage.

### Solving problems involving mixed decimals, percentages and fractions

Find 10% of half of 2.6.

This activity may be carried out with step by step guidance, or by allowing the student to follow their own method of solution. The approach should be chosen in sympathy with students' skills and depth of understanding.

### Activity:

An intermediate school has ten classes with 24 students in each.

Instead of regular classes, it is offering 6 'electives' for a week when 20% of the students will be away for an interschool sports exchange.

0.125 of the students who will remain at school, have chosen to take elective A.

One sixth chose elective B.

The rest of the students all chose the four electives, C, D, E and F in an exactly even split.

How many students can the teachers taking C expect in their elective?



## The procedural approach

The student is able to solve a problem involving mixed decimals, percentages and fractions, with guidance.

Prompts from the teacher could be:

1. How many students are on the school roll?
2. How many students will be away on the sports exchange?
3. How many students will be attending the electives?
4. Find the number of students (from your answer to 3) who chose elective A.
5. Find the number of students (from your answer to 3) who chose elective B.
6. Find the number of students who will be in the remaining electives.
7. If there are four remaining electives, what will be the share of students for each of these? (...and so how many will be in elective C?)

T: Tell me about this arrow.

S: I was about to find one sixth of the students left over, when I realised that it was just one sixth of those not at the interschool, so I had to go back to the 192, not 168.

$10 \times 24 = 240 \rightarrow 20\% = \frac{20}{100} = \frac{1}{5}$   
 $\frac{240}{5} = \frac{480}{10} = 48$  interschool  
 $240 - 48 = 192 \rightarrow 0.125 = \frac{0.25}{2} = \frac{0.5}{4} = \frac{1}{8}$   
 $\frac{192}{8} = \frac{160 + 32}{8} = 20 + 4 = 24$  in A  
 $192 - 24 = 168$   
 $\frac{192}{6} = \frac{180 + 12}{6} = 30 + 2 = 32$  in B  
 $168 - 32 = 136 \rightarrow \frac{136}{4} = \frac{120 + 16}{4} = 30 + 4 = 34$   
**Answer = 34**

T: I'm very interested in how you've written this fraction.

S: Well, you have always said that a fraction is a way of dividing, so I knew that 136 quarters means  $136 \div 4$ . I can't do that, but I can break 136 into bits that four goes into. Then it's easy to divide.

## The arithmetic approach

The student is able to use numerical techniques to solve a problem involving mixed decimals, percentages and fractions.

Prompts from the teacher could be:

1. Identify the quantities/ proportions given in the problem.
2. List the proportions given, in a comparable and useful form (eg all % or all decimal or all fractions).
3. How many students will be attending the electives?
4. Find the number of students (from your answer to 3) who chose elective A.
5. Find the number of students (from your answer to 3) who chose elective B.
6. Share the remaining students amongst the remaining electives, and so find how many will be in elective C.

T: This table looks very useful.

S: Yeah, I try not to do too much calculating, and a table of facts to look up helps. I worked out the fraction for 0.125 by finding it from simple ones like 0.5 halved and halved.

Fractions	%	Decimals
$\frac{1}{2}$	50	0.5
$\frac{1}{4}$	25	0.25
$\frac{1}{8}$	12.5	0.125
$\frac{1}{3}$	33.3	0.333
$\frac{1}{6}$	16.6	0.166
$\frac{1}{10}$	10	0.1
$\frac{1}{5} = \frac{2}{10}$	20	0.2

$\frac{1}{6}$  of 24 ? ~~24/6~~

$6 \times ? = 24$       4

$\frac{1}{8}$  of 24 =  $\frac{1}{4}$  of 12  
 =  $\frac{1}{2}$  of 6  
 = 3

10 classes of 24  
 $\frac{1}{5}$  at interschool  
 $\frac{4}{5}$  in electives  
 $\frac{4}{5}$  of 10 is   
 8 classes in electives  
 (same number anyway)  
 =  $8 \times 24$

In each 24,  
 4 in B and 3 in A  
 $24 - 7 = 17$   
 So 8 lots of 17 take 4  
 classes  
 2 lots of 17 in each  
 class

answer is 34

T: I'm interested in how you've operated on whole classes in each step.

S: I thought about finding the fractions of the whole school, but that meant multiplying by big numbers so I found a way around that. Anyway the 24 in each class is a cool number, because lots of numbers go into it.

## The conceptual approach

The student is able to use original techniques to solve a problem involving mixed decimals, percentages and fractions.

Prompts from the teacher could be:

1. Find many students who will be attending the electives.
2. Find the number of students (from your answer to 3) who chose elective A.
3. Find the number of students (from your answer to 3) who chose elective B.
4. Share the remaining students amongst the remaining electives, and so find how many will be in elective C.

